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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/579,506	05/15/2006	Vinay Manjunath Pai	36180/US/2-475396-00175	6558
30873 7590 05/23/2007 DORSEY & WHITNEY LLP INTELLECTUAL PROPERTY DEPARTMENT 250 PARK AVENUE NEW YORK, NY 10177			EXAMINER VAUGHN, MEGANN E	
			ART UNIT 2859	PAPER NUMBER
			MAIL DATE 05/23/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/579,506

Applicant(s)

PAI ET AL.

Examiner

Megann E. Vaughn

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14-18 is/are allowed.
- 6) ☒ Claim(s) 1-8, 19, 20 and 22 is/are rejected.
- 7) ☒ Claim(s) 9-13 and 21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 5/15/06, 6/5/06.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-8, 19-20, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's own admission (Background Information of specification) in view of Devito et al (US Patent No 5,421,331).

Regarding claims 1, 19, and 22, applicant admits as the known conventional method for prescribing radial slice planes for MRI along a long-axis of a target (Specification, page 1, 24-27 and page 2, line 6) comprising:

acquiring vectorial components for a short-axis slice of the target (page 1, lines 21-27: page 2 lines 2-5, "acquiring vectorial components for a short-axis slice" means defining the short-axis slice and defining SS, PE, and RO directions, the conventional method described here includes imaging short-axis slices which inherently requires first defining the slice (and then defining SS, PE, and RO directions (vectors) associated with the slice), thus the known manual procedure has included the step of acquiring vectorial components),

establishing vectorial components for a long-axis slice using the vectorial components of the short-axis slice (page 1, lines 24-27; page 2, lines 7-10, 23-27-the known method includes the step of defining 8-10 uniformly angularly spaced long-axis

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slices which are perpendicular to the short-axis slice and encompass the region imaged in the short-axis slice, "establishing vectorial components" once again means defining the position and orientation of the slices, including defining their SS, PE, and RO vectors, the definition (vectorial components) of these long-axis slices depends on the definition (vectorial components) of the short-axis slice, hence the vectorial components of the long-axis slice are established using the vectorial components of the short-axis slice), and

defining a plurality of long-axis slice planes positioned relative to the long-axis slice, each of the slices being rotated about a long-axis in a direction of a long-axis frequency encoding vector (page 1, lines 24-28; page 2, lines 23-27).

The applicant's admission does not expressly show automating the process, or a computer-readable medium comprising instructions for carrying out the hitherto manually carried out steps.

Devito et al discloses a method and computer readable medium comprising instructions for carrying out the method in a related medical imaging art (col 1, lines 31-37- a computer performing the method as described by Devito et al must inherently read instructions from some sort of computer readable medium comprising those instructions) for automating a hitherto manually preformed process (col 1, lines 44-54) of defining the long-axis of the heart (col 1, lines 55-57) and defining imaging slices according to this determination (col 2, lines 8-12). Devito et al. are solving the same problem applicant is addressing-the reduction of human error in the medical imaging process (col 1, lines 39-44: col 4, lines 22-28) and the freeing up of the medical

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technician's time (col 1, lines 51-54) through automation of determining the long-axis of the heart and defining imaging slices using this determination. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Devito et al to the conventional method described by the applicant, in order to gain the advantages as described by Devito et al., namely the reduction of human error (col 1. lines 39-44: col 4. lines 22-28) and the freeing up of the medical technician's time (col 1, lines 5-54) through automation.

Regarding claims 2 and 3, applicant admits as conventional the step of obtaining a short-axis image among the short-axis slice of the target (page 2, lines 2-5), and admits as implicit in the process of prescribing a slice the definition of vectorial components, such as the SS vector, the PE vector, and the RO vector (page 2, lines 7-9).

Regarding claims 4-6, and 20, it is admitted as known that the long-axis slice will be perpendicular to the short-axis slice (that is, that their SS vectors are orthogonal), and that the RO vector of the short-axis slice is parallel to the long-axis (page 1, lines 24-28). The known method includes any orientation of the vectorial components of the long-axis slice that satisfy this orthogonality condition (page 1, lines 24-27), which includes the one defined by transposing the short-axis vectorial components. Regarding claim 5, an instance of this is transposing the SS and RO directions of the short-axis slice would result in the SS direction of the long-axis slice being in the plane of the short-axis slice (perpendicular to the SS direction of the short-axis slice), and the RO (frequency encoding) direction of the long-axis slice being parallel to the long-axis

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("down the barrel" of the heart), in accordance with the conventional method (page 1, lines 27-28). Regarding claim 6, "establishing vectorial components of the long-axis slice by transposing the SS and RO directions of the short-axis slice" means "defining a long-axis frequency encoding vector (RO) as a short-axis slice selection vector ($R_o = S'$) and defining a long-axis slice selection vector (S_o) as a short-axis frequency encoding vector ($S_o = R'$)". The limitation $P_o = P'$ is a consequence of the transposition and the known definition that the PE direction is normal to both the SS and RO directions (page 2, lines 10-11- P_o may equal either P' or $-P'$ according to the admission's prior art), hence the discussion of claim 5 also applies to claim 6.

Regarding claim 7, it is admitted as conventional to define a plurality of long-axis slice-planes rotating about a frequency-encoding direction (page 1, lines 24-28; page 2 lines 23-27).

Regarding claim 8, the claim limitations describe defining a series of n uniformly angularly spaced long-axis planes (each with perpendicular SS and PE directions, and each sharing a common readout direction) all passing through the long-axis of the heart, rotated about the RO direction (the long axis, "down the barrel of the heart"). The acquisition of such a series of uniformly angularly spaced long-axis slice images is admitted as conventional (page 1, lines 24-28; page 2, lines 23-27; for example, n is equal to 8 or 10).

Allowable Subject Matter

3. Claims 14-18 allowed.

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The following is an examiner's statement of reasons for allowance:

Claims 14-18 are allowable over the prior art of record because the prior art of record does not teach or disclose a magnetic resonance imaging apparatus comprising determining a frequency shift for the long-axis slices, in combination with the remaining limitations of the claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

4. Claims 9-13 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance:

Claims 9 and 10 are allowable over the prior art of record because the prior art of record does not teach or disclose a method of automatically prescribing radial slice planes for magnetic resonance imaging along a long-axis of a target, comprising modifying an RF transmitter and receiver frequency and phase to accommodate the defined long-axis slices, in combination with the remaining limitations of the claims.

Claim 11 is allowable over the prior art of record because the prior art of record does not teach or disclose a method of automatically prescribing radial slice planes for magnetic resonance imaging along a long-axis of a target, comprising modifying an RF

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transmitter and receiver frequency by a slice select shift for each long-axis plane, in combination with the remaining limitations of the claims.

Claim 12 is allowable over the prior art of record because the prior art of record does not teach or disclose a method of automatically prescribing radial slice planes for magnetic resonance imaging along a long-axis of a target, comprising modifying an RF transmitter and receiver frequency by a readout shift for each long-axis plane, in combination with the remaining limitations of the claims.

Claim 13 is allowable over the prior art of record because the prior art of record does not teach or disclose a method of automatically prescribing radial slice planes for magnetic resonance imaging along a long-axis of a target, comprising modifying the phase-encode direction for each long-axis plane, in combination with the remaining limitations of the claims.

Claim 21 is allowable over the prior art of record because the prior art of record does not teach or disclose a computer-readable medium having stored thereon computer executable instructions for automatically prescribing radial slice planes for magnetic resonance imaging along a long-axis of a target, wherein the instructions configure a processor arrangement to perform the steps comprising further executable instruction which adapt the processing arrangement to calculate a readout frequency shift, a slice selection frequency shift, and a phase shift for each of the long-axis slice planes, in combination with the remaining limitations of the claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

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accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

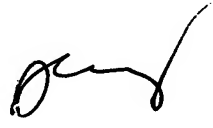
Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Megann E. Vaughn whose telephone number is 571-272-8927. The examiner can normally be reached on 8 am- 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on 571-272-2245. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MEV
Patent Examiner Art Unit 2859
5/16/2007


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